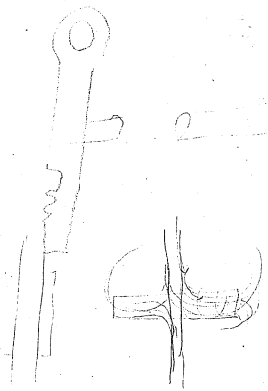
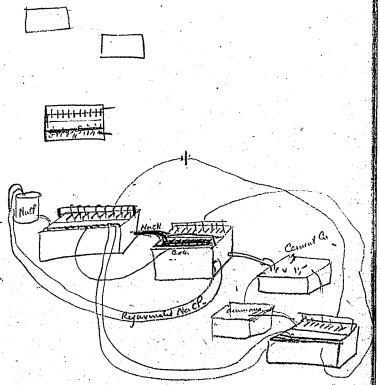
**Notebook, N-90-01-04.7**

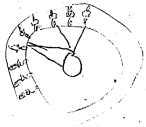
This notebook covers the period January-May 1890. All entries are by Edison. The book contains extended theoretical notes about electricity and electromagnetism, including an entry in which Edison compares his own theories with those of James Clerk Maxwell. There are also notes and drawings relating to unidentified electrical equipment, ore milling and bricking machinery, electric traction, and electric lighting experiments for both incandescent and arc lamps. In addition, there is a list of chemical compounds to be tested. The front cover is labeled "#580." The inside front cover is inscribed "#580 T A Edison Jan 4. 90." The pages are unnumbered, and the book has been used in both directions. Approximately 160 pages have been used.

#580

T. A. Edison
Jan 4 - 90







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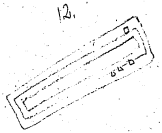
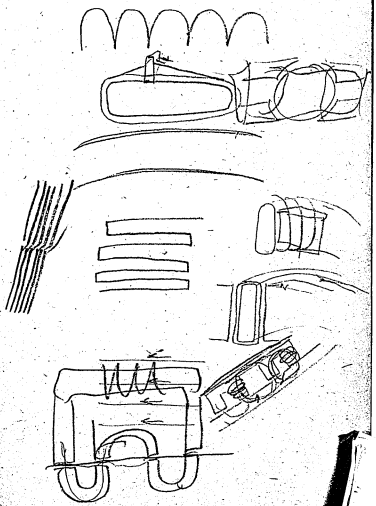




[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

N-90-01-04

12 - 55 C
64
119 -
162. 500) 3200 (64
30 00
2 00

1300
8
130) 1040 0 (80
104 0

350
350
500
200
35) 14000 tons (400
140

10
25
10
15
65
15

400

Side tube in Lamp - + Carb Compound

Albumen absorbs $20 before goes to Lamp

alcohol (absolute) - dis olved fused Chl Calcium saturate, then Chill out. a Calcium alcoholate, in Crystals which on heating give off only pure Carburetted Hydrogen

Watts, Vol 1 p 80 alcohol must have no water

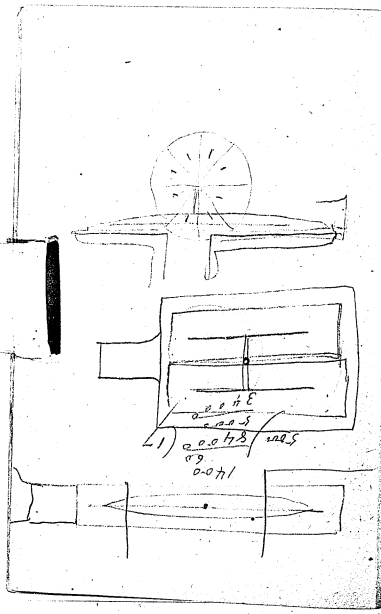
ammonia aldehyde - Resin

Analine oil -

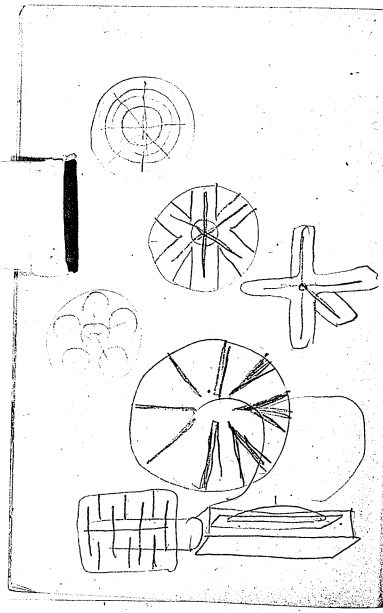
Cumeline

Cyanimide

Naphtylamine
phenylamine
Triphenylamine
Picoline
Piperidine
Pyridine
Amarine
Amarone
amylate Potassium
do Sodium
anise Seed
Benzoic acid heated with Caustic Lime
gives off Benzol
Phtalic acid heated Caustic Lime
Dry Distillation Quinic acid
Benzoic gives off




Camphor -
Caoutchouc, dry
gutta-percha dry
Mellone
Iodoform
Chinoline
Rosin -
Amylate Soda
Conine · $C_8H_{15}N$
Copaiba -
Tolu - Balsam
Peru
Copal -
Amber cha



Cyanamide. $CNH_2$

Cyanide of metal.

Cyanide Amyl - Capronitrile
$C_6H_{11}N$

Solid Chloride Cyanogen
" Bromide "

Dammar Resin - Cowdie gum,
gives off Dammarol $C_{10}H_{16}$

Benzonitrile

Elemi Resin

Formate of Lead - Brass - Zinc Polish

Butyrate " " "

gum Euphorbium

Cholesterin

& Ethal -

Gum Galbanum

Hydrobenzamide CHN

Hydrocinnamide - "

~~Hydrobenzamide CHN.~~

Pyrene.

Iodoform-Cyanide of Silver

gives " Hg

~~Prussiate~~ Cyanogen.

Napthalamine Alpha Beta

Linseed Oil -

Lophine - CHN pyrobenzoline

Lupulin -

Mastic

Melam — CNH

Beeswax

Spermaceti.

Chinese wax -

Stearic acid

Paraffine almost only mixed with following — Gasoline, Camphor, also Rosin mixed with Paraffine Tarred -

Aniline, Bisulphide Carbon —

-Turpentine. Tolol — Naphtha

Paraffine oil — amyl -

Chloral Hydrate, do + camphor

Chloroform. do Chloroform + Turpentine

Oil Cassia, Menthol — Lemon, Wintergreen, Bergamot,

Mellone — gassed — gm

of - N Cy + Hcy —

Mellonide Hg — do Ag —

1/2 oz dark -

50 oz olive

Dark — 2 oz Bicarbonate

Free — 2 Bicarbonate

Lyme

Pb 3 73 /20 -

Pb 1 1/2 4

50 Bicarb

Yam Myrh –
Carnauba Wax

Sheerah Soda
" Alumina
" Lead –

Phenyl-Carbamic acid
gives of aniline $C_6H_7N$
to Salicylamide,
" azoxybenzine
Indigo –

distilling

aniline Soluable in Colophony
hence make a salad of Rosin & Aniline

Diazobenzine $C_6H_4N_2$ or azophenylene

Aniline Blue - CHN
in purple -
Red
all the aniline Colors but black

- Cyan - de phosphorous
Venice Turpentine
Burgundy pitch
Coal Tar
wood Tar
asphalt Pitch
Syrian asphalt
Piperidine - CHN

5400
7500
12950 (17.12
1500) 25850
15000
10850
10500
350

300 — 18
500 15
350 20
350 17
1500 2) 37
18.5

185
700
1295

1295000

6.18 tons,

2400
168
2400 (6.18
120) 408
66) 396
12
66
54

450 — 7200
400 — 8000
350 — 5950
300 — 5400
0

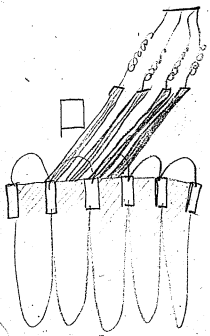
1500) 26550 (19.
15000
11550
10500
1050

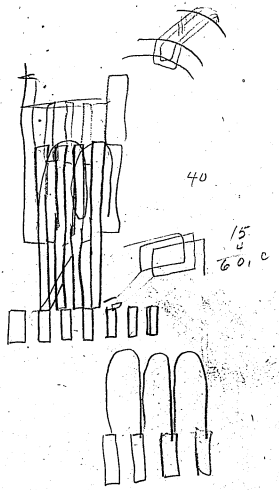
450
16
270
45
7200

350 — 2400
17 — 300
245 — 2100
350
5950

9200
8000
5950
5400
1500) 2850 (1.9
15000
13550
12500
15500

19%

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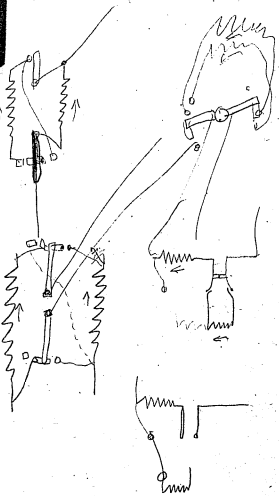
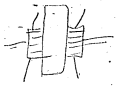
15
60, c

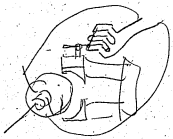


patent,

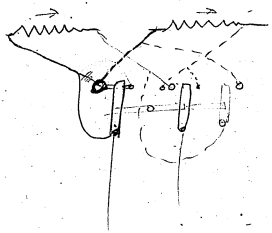
1 patent

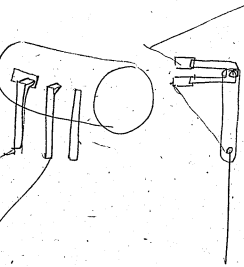


2nd pat



4th patent,
patent,





Quad

2) 22.3 — 10 deg — 1 watt

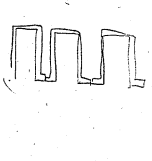
2) 11 1.1.5 — 20 "

2) 5.5.5 7 — 40 "

2.07 8 — 80 "

2" per 100 deg 1 watt,

1 watt
223"
Each deg 4 John



6 — 480 — 180 —

22.3 — 10 deg John 1 watt

2 Watts $\frac{1}{20}$

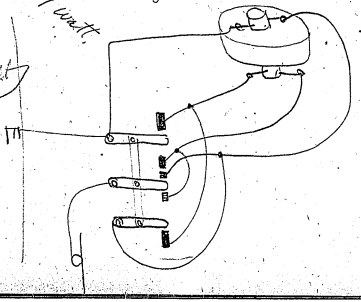
3

$\frac{1}{100}$ of Volt —

$\frac{1}{10}$ th Volt

$\frac{1}{10}$ Volt —

25 — $\frac{1}{4}$ Volt



16
66 ) 4000 ( 970
64000
594
462
462

4000
17
28000
40000
66 ) 68000 ( 1030
66000
2000
1980
20

2200
18
17600
22000
66 ) 39600 ( 600
396
396

250
9
2250
2250
45000

400 ) 25 4500
16
27000
45000
66 ) 72000 ( 1090
66000
6000
594
54

800 — 16000
600 10800
800 13600
2400

2200 ) 404 ( 1836
2200
18400
17600
8000
6600
1400

18
600
10800

17
5400
13600

36
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264
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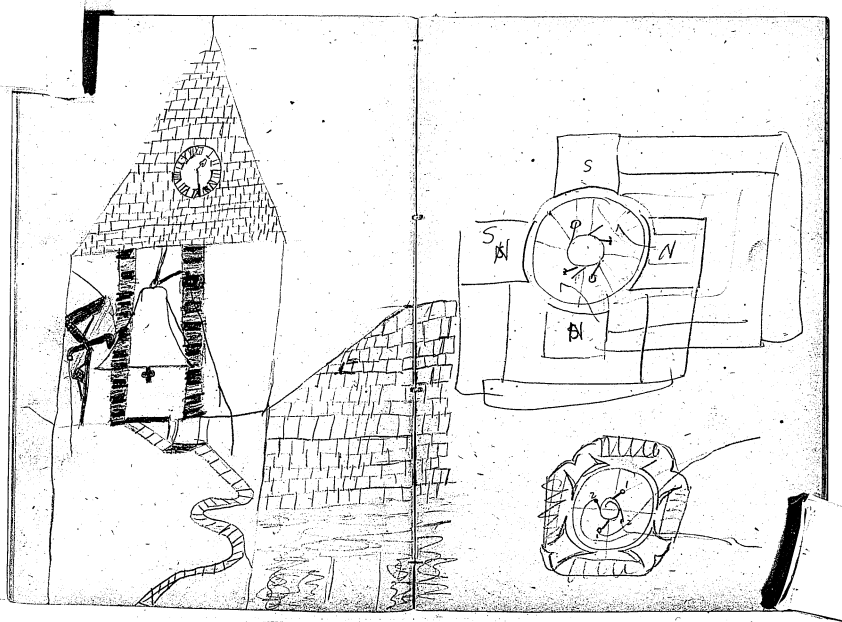
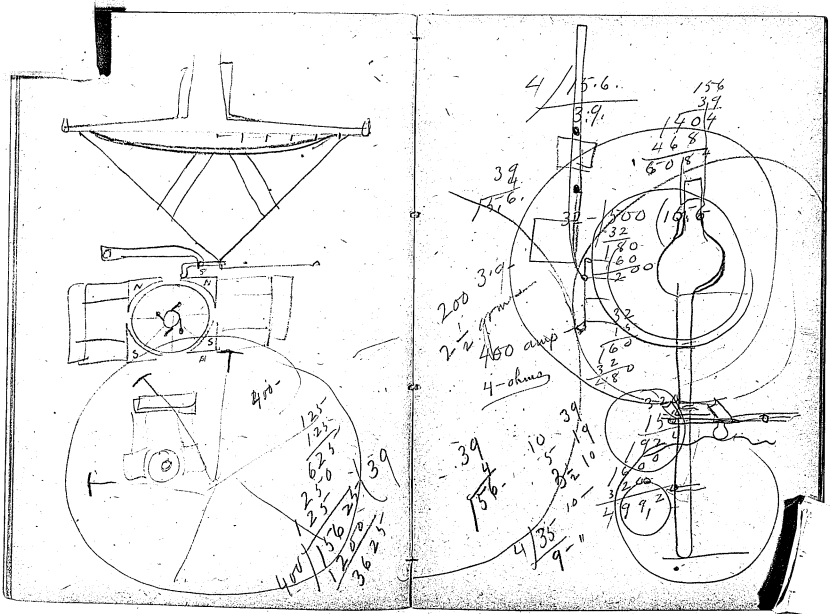
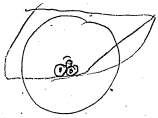
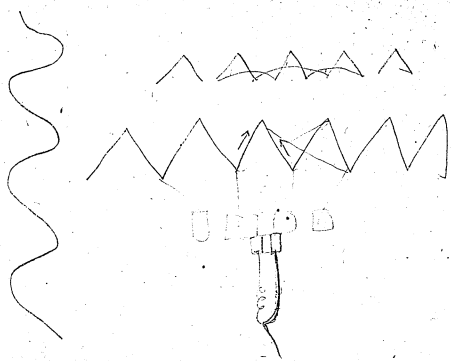
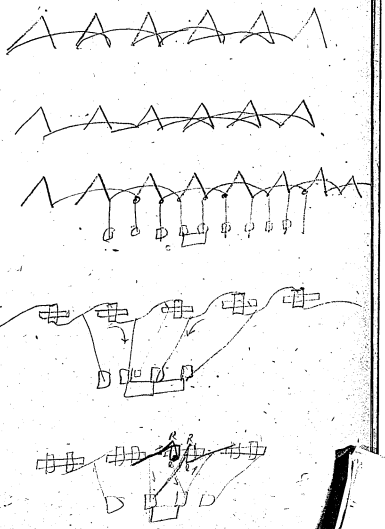

S
S
N

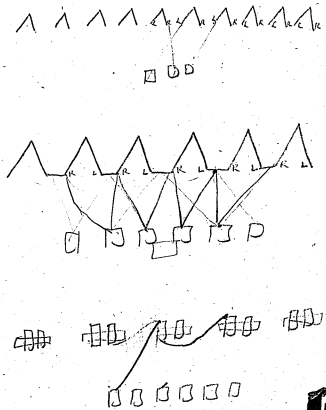

200 3.0
2½ grams
400 amp
4-ohms



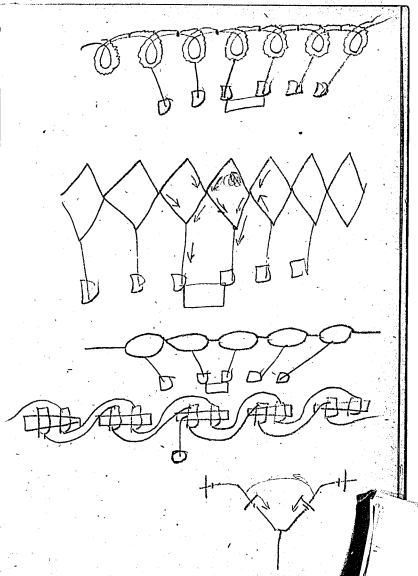
1 of 1 neutral nozzank

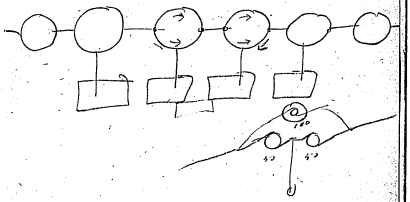


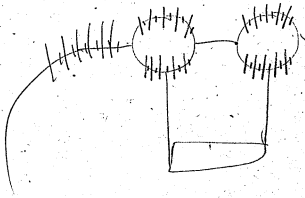




5·7 lb 1 c Coke –







125
175
100
50
2.50
125
25
50
52
950

175
125
30.0

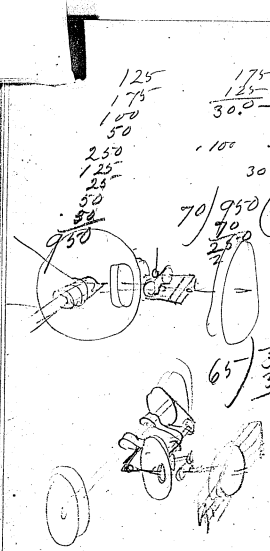
.100 33

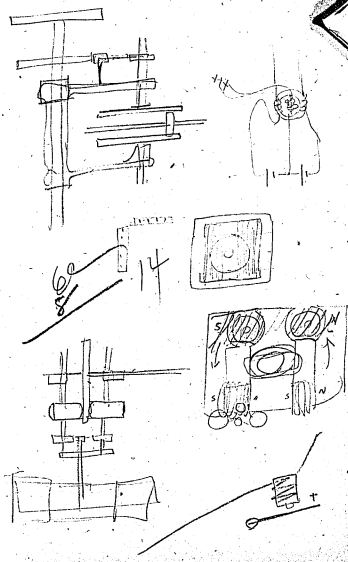
30

70)950(13c
70
250
70

13
20
260
130
390
32

65)





49
20
15 ) 980 ( 65
900
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8.
4
10 lbs
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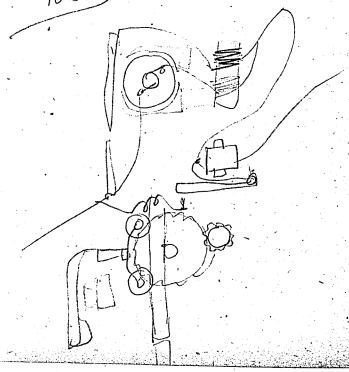
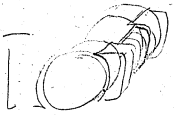
2





1803
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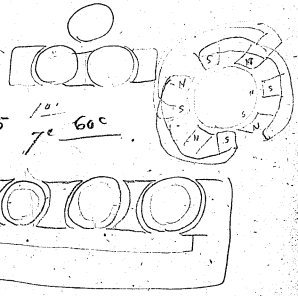
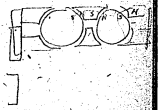
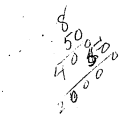
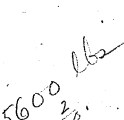
1891.

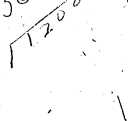
100
50
10
160.
5
25
10.
7°
60°

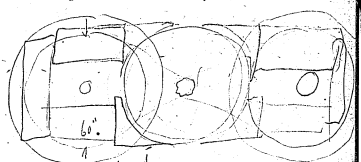


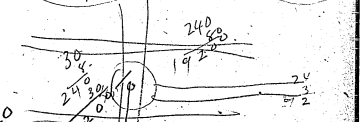


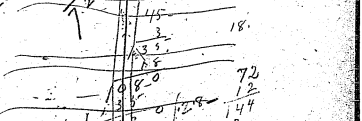












Brown

You are to keep a book in which you enter
Each day the following -

Total No of Each Volts of Lamps off a days
photometer run - This will show the average
Volts of the Lamps.

2 The Volts used in Exhausting Lamps.
The first pegging in showed 60 110 Volts
and finishing 160 or 175 Volts.

3rd Report of any Lamps go to dull red
on 1st pegging in - if so what proportion
Note the Resistance box that does this
its number on the dials -

Note how many pegs they go up on
average before filament becomes red
Note general Condition of boxes of they
are regular & do not have places where
there is too great a jump of Candle
power =

4th Note average time before getting
Vacuum before pegging - also if they

(2)

pag — before tube is solid — If they seal off when before tube is solid — ~~when~~ and what percentage roughly they do this = also what they do when pumps dry =

5th = State of Mercury — of swabs for cleaning tubes — If oily = ~~test~~ Mercury by running in smooth writing paper I will show you about this —

6th = Note everything done in pump room — from the 1st day you take hold, and then every change thereafter that takes place —

7th Describe in detail how they work the blur off etc —

8th Inspect the phosphorous cup note average of those cups which are jammed over an top of phos — of different amount etc —

9th = State of phosphorus in the mechanical dryer – also of fine flakes phos are liable to be carried up with blast –

10th = Note if they try to run a pump too long –

11th = Note if the Volts used in pump room vary much –

12th Note in room where Carbons are unpacked or put on wires how they handle them if no injury is done.

13th = Note if the temperature of Baking oven when Lamps are healed before putting on gauge of temperature is greater than necessary to slightly brown paper –

| | | |
|---|---|---|
| 100 | | 40, |
| 60 | | 24.80 |
| 35.20, | 60 cm | 14.76 |
| 20.44 | 34 | 8.67 |
| 11.77 | 217 | 5.07 |
| 6.70, | 126 in | 2.88 |
| 3,82 | .130 | 1,06, |
| 2.76 | | .76 |
| 2.00 | | .30 |
| 1.60 | | .14 |
| 1.00 | | 98.45 |
| .60 | | 190 yards |
| .50 | | 4 |
| .30 | | 2 |

146.89

25.1

146-

60 lbs-

50
80
40

14-

Take 20 Lamps each day just as the Come bring them to dark room and record spots - devise a system of your own to give the degree of spotting =

15th = See that in Sealing in machine flame does not strike filament + also of any injury from handling -

16th see if ~~the~~ bulbs are generally clean before sealing in =

17. Report defects in claimps material + all other defects of whole output. The factory

60 = c delivered

122 40
24
16
8
3
2,50

1 5 12 50 c
3

2 1/2 time

80
30
22
5
5
142
84
226
35
Total 261 Wages

4 days

15

1200
3
3600
24
14400
7200
86400

3.8
3
114
11
125

835.0

has this I believe and they can give you a copy

Make your report Wednesday and Saturday Each week to me —

48
70
25
15
16
7 oil used
171
150

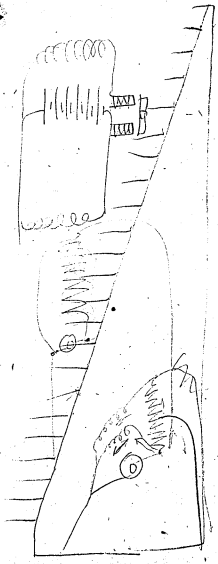
5000) 60000 (12
5000
10,000

12c

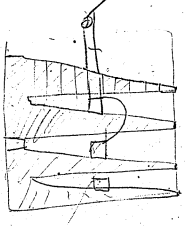
| | |
|---|---|
| Wages | 266 |
| Coal | 125 |
| wood | 5 |
| oil | 15 |
| Rollerson | 40 |
| Screenworker | 6 |
| Coal for Drys | 50 |
| general | 25 |
| Belts | 10 |
| | 542 |
| | 3 |

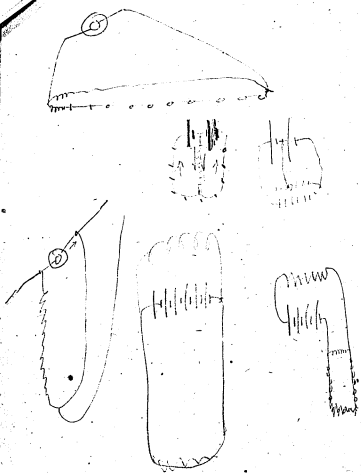
No 1
120
60
30
15
7
3
50
100
200
400
800
1600


No 2

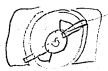



Short ckt series wound
Copper sheath –
also throw on Res
No 3 cop sheath shunt wound





No 4



and shift

No 5

moves in bigger
moves levers to
move brushes on
Res fr fields

3.82
35
1910
1146
133.70

6.70
2.82
3.82

1.77
5.07
6.70

6.70
35
335.0
2010
2345.0
126
360
85
2.85.00

1.77
35
5.885
35.31
411.95
217
628
80
5.024.0

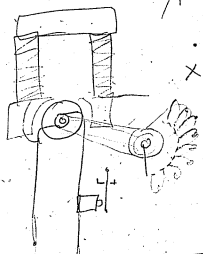
3.82
106
2.76

2.76
35
1380
828
966.0

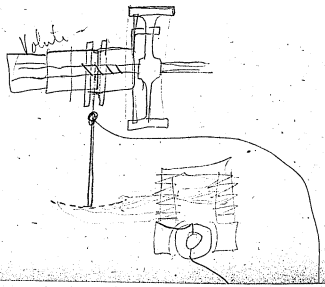
6.28
5.02
1.26

1.33
80
106.40

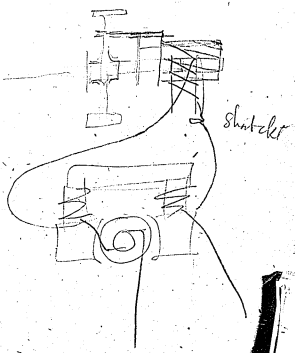
.96
80
.7680



No 7




No 8



2044
867
11,77

35-20
30-

10-

60 00
24 50
35.20

50-
80
400

50

60
35
30
180
31.0

2044
35-
10220
6132
715-
369
-7909

3520
1476
2044

21
10
31
80
24.80

31 00
24 50
6.20

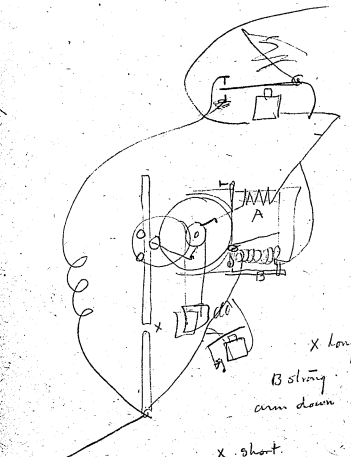
7025-
1325
1180
12.25-
6120
7845-
80
9,7 60 0

715
369
1084
80
8.67.2

9 inches
9 inches

1845-
1476
3.69

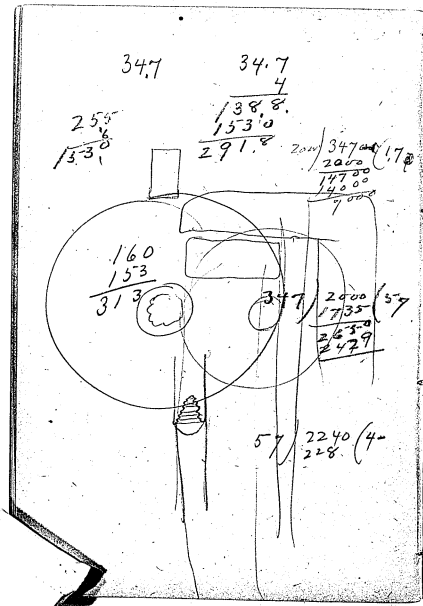
1084
867
217

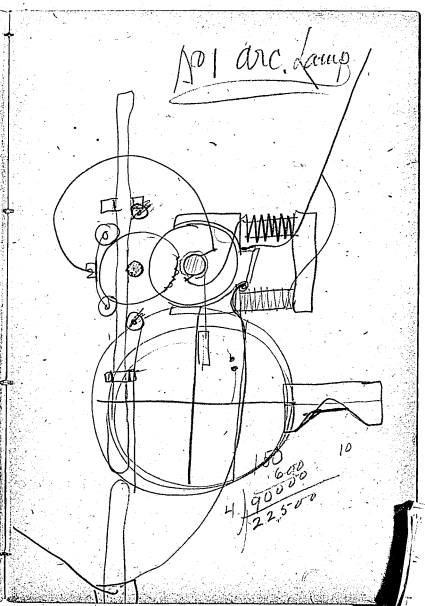


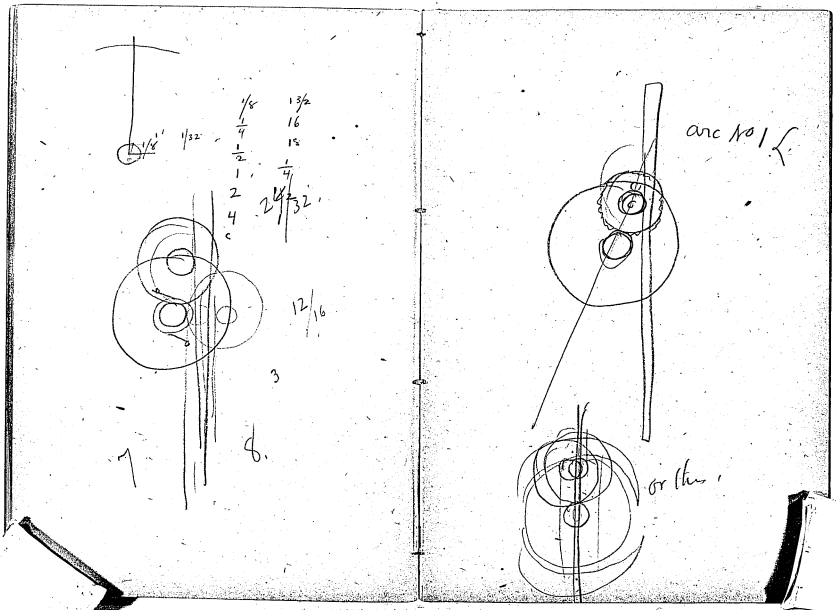

X long
B slung
arm down

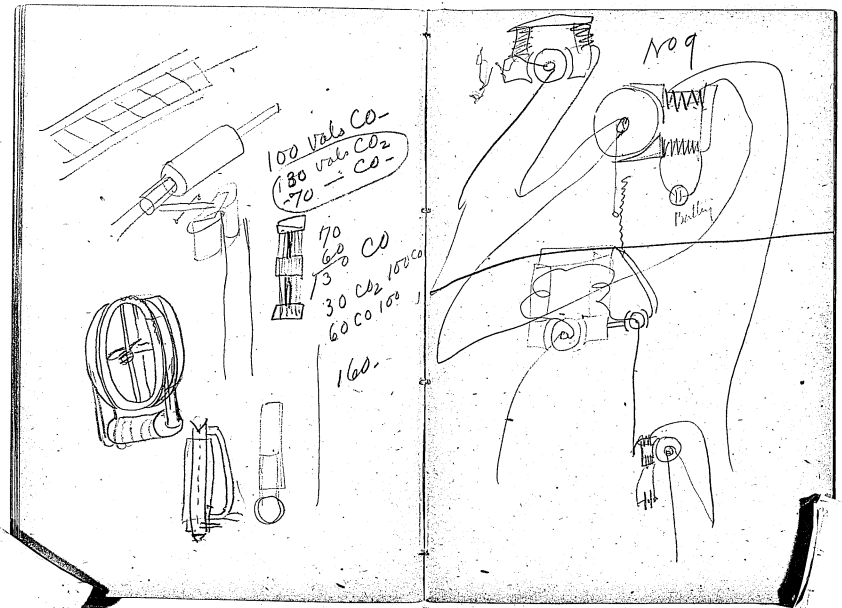
X short
A slung arm up

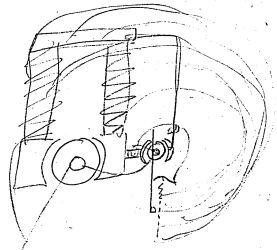
Current off.


34.7
34.7
4
138.8
153.0
291.8
255
6
1530
160
153
313
347
2000
1700
4000
3000
1000
347
2000
1735
2650
2429
57
2240
228

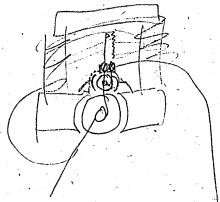

No 1 arc. Lamp
10
100
640
4
90000
22500


1/8
1/32
1/8
1 3/2
1/4
16
1/2
1/4
1
2
4
24/32
12/16
3
7
8.
arc No 1
or the


100 vols CO-
130 vols CO2
70 — CO-
170
60
CO
13
30 CO2 100 CO
60 CO 100
160.
No 9
Pulley



No 10 -.



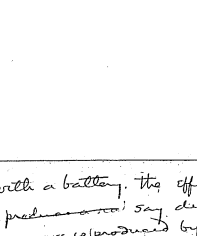
No 11

1st. The Ether is what we call Magnetism
Condensation or a stress in Ether "simply manifested
by increased magnetism" —

Electricity is produced in any arrangement ~~which~~ which can conduct and return an impulse to its place of origination by a condensation or diminution of the orbit of the molecule or displacement from one position to another position of the molecules where any condensation can take place —

in a thermo ~~bar~~ heat travelling expands the distances of the molecules when these reach the metal which there is a change in temperature by a poor conductivity for heat. the distances between the molecules will suddenly diminish & thus will produce a molecular wave throughout the Circuit & produce what we call Electricity as with sound waves on a wire . . .

with a battery. the effect is to produce ~~an~~ say decompose water a wave is produced by transposition of O from H. + a condensation by combination of O with Zn + H with O of say Copper oxide —

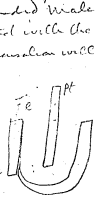


~~When~~

In producing a wave by electricity or magnet. there is a rarefaction & condensation of the molecules by the stress acting on the molecules. these stresses lines of which they are billows in a Conductor enter between the molecules in & out of which there are also billows produced. ~~Rare~~ condensations at one point & rarefaction at other, point & rarefaction

Magnetic lines or Ether pervade all space but around the Earth there are Condensations & thus we have the Magnetic lines of the Earth.

If a Carbon disk is brought to a white heat in a non oxdg. atmosphere and a large wheel of silver runs in its periphery the same being hollow + cooled with water - there will be a current generated (when ~~[illegible]~~ by reason of the sudden condensation of the expanded molecules when it makes contact with the cold silver this condensation will produce a wave




Perhaps a balloon no offer all only a thermo - the thermic action of decomposition taking place at the surface of the positive metal heat the pressure for 50 a billionth of a second home no possibilities of heat in the electrode + a condensation by cooling -

~~the temperature of combustion locally perhaps~~

$$11\overline{)140}\ (12.72$$

$$\begin{array}{r} 11 \\ \hline 32 \\ 22 \\ \hline 80 \\ 77 \\ \hline 3 \end{array}$$

8.75
16
5250
8750
140.00

$$16\overline{)1654}\ (103.4$$

$$\begin{array}{r} 16 \\ \hline 54 \\ 48 \\ \hline 64 \end{array}$$

14

$$16\overline{)\begin{array}{r}1272\\2\\\hline 2544\end{array}}\ (159$$

$$\begin{array}{r} 16 \\ \hline 94 \\ 80 \\ \hline 144 \\ 144 \end{array}$$

12.72 oz per Rev

140 oz 8.75 lbs started

13 Revs wanted 6 oz 165.4 oz or 10.35 lbs increasing temp of hot blast stove should tend to raise the pressure ~~of the blast~~ The Briquette just supplied the opening power of the Coke & limestone taken off as slag formed — & the raising of blast from 1000 to 1100 @ 1200 faler —

Each Rev of Eng made 25 tons Extra, 2 Revs s/o — 15 Revs should make — 200 tons

& mean pressure 1.59 lbs

(10) from 10.35 to 11.94 say
12 lbs - with gas to 13 lbs

10.35
1.59
11.94

300 — 72 — 149 - tons

225 — 90 —

151 — 38 m — 34 - 8

61 — 13 m

26 — 7 m — 16

10 — 4 — 6

4 — 3

2

1

480

2

1

1

480 — 120

4

480

130 — 70 hp

3

90

130

35

650

39 3

45 5 0

7.5

70

5 0

35

70

245 0

245

170

41 5

5

3

8

26

16

4 0

26

50

13 0 0

7

20

80

160 0

225

50

112 5 0

151

5 0

75 5 0

38 0 0

112

75

187

80

1496 0

113 5 0

80

90 40

300

149

151

187

149

38

151

90

61

30,50

13 0 0

43 5

80

348 0 0

6100

348

26.2

350-
350-
300
1800
600
600
250
3700

174
350

3700
8
298

400

10
170
27

70

34
70
23,800

3.4 | 60 (1.86
34
260
238
220

190-

1.9
8
16.5
50.0
6.6.5-

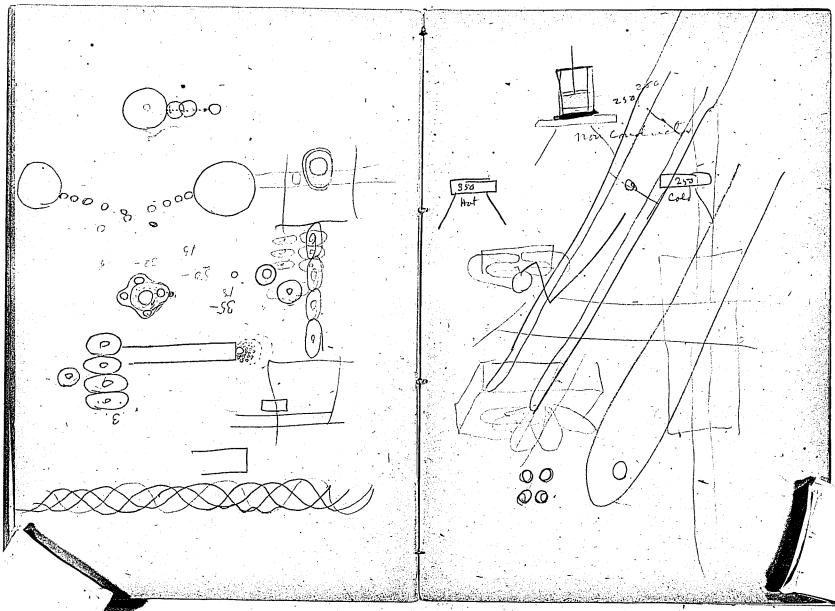
108
1120
2280
1995
2860
2060

665 | 2280 (3.4

665
3
1995
266
2261

2660

3.4


250
Hot
250
Cold
250
Cold
Hot Conductor

Iron Atomic weight 56.
Equivalent ~~28~~ Fe = 28 Ferrosum -
Fe = 18 2/3 - Ferricum.
All iron contains Carbon -

Pure iron - extremely tenacious
soft & ductile ordinary malleable
iron - presenting a scaly
conchoidal, or sometimes crystalline
fracture. Specific gravity after
melting — 7.8439 — in
sheet or iron 7.75 to 7.60 -

Iron by Electrolysis spec
gravity 8.1393
Scarcely acted on by acids at
ordinary temperature
but by heat evolves H without
the peculiar smell.

Crystalizes from either the
Cube, Octohedron, or some other
form belonging to the Regular
system -

Specific Heat of ordinary
malleable iron 0.11379
somewhat higher when an most carbon
is hanging - (Regnault)

Conducting power for heat
gold being 1000 to 374.3
Property

Linear & Cubical Expansion is less
than most metals -
Linear Ex for each deg between
100 & 300 C = 1/68100 (D & Petit)

An iron bar Expands 3/560 when heated
from a red heat to white heat
+ 7/560 when heated from 20 C
to whiteness. (Rinman)

Melting p that certainly determined 1550 C by Pouillet, 2000 C by Scheerer

Electric Conductivity –

Cu 100 then Fe 20 (Hanns) 15.8 (Bragonier) — 17.74 Lenz –

~~Platinum at 0 C~~ 91.8 / 72.8 / 84.6 } Matthiessen

~~Electrolytic Iron at 0 C = 100.~~

| | Conductivity at 0 C | % decrease in Conductivity at 0 = 100° | Conductivity of pure Fe at 0 C |
|---|---|---|---|
| Electrolytic Fe | 100 | 38.3 | |
| Plate Fe | 91.8 | 36.0 | 102.7 |
| | 72.8 | 34.1 | 102.7 |
| | 84.6 | 34.7 | 99.2 |

Matthiessen

up to temp of 146 C Boiler plate tenacity not perceptibly diminished at red heat reduced 1/4th is tenacity of good iron now at 190 C is 1/3 greater than at ordinary temp but at red heat reduced nearly one half

Malleability increases with temperature. While heat the penetrating its plastic + kneadable far below the melting point.

Combines with O when heated to 230 C in air

Decomp $H_2O$ at 360 C

Burns at white heat.

Swedish iron

| | No 1 | 2 | 3 |
|---|---|---|---|
| Iron | 99.803 | 99.220 | 99.594 |
| Carbon | 0.054 | 0.087 | 0.087 |
| Silicon | 0.025 | 0.056 | 0.115 |
| Sulphur | 0.055 | 0.632 | 0.220 |
| Phos | Trace. | 0.005 | 0.034 |

Only iron free from C is called burnt iron — this Cast Fe melted, but on cooling this is because of oxide getting in

Sulphur makes Fe Red short
phos " " Cold short
S. " " Rotten
Cu. " " Red short in
(when do especially by Washed)
Manganese " " Harder but not stiff

Linear Exp of Cast iron
$\frac{7}{560}$ bet 20 & 560 C (Red heat) -
& $\frac{12}{560}$ bet 20 & white heat (Rimmer)

Cast Fe increases in bulk when cooled from Liquid
pieces C Fe thrown into fluid Cast iron sink but when near MP float
The greatest amount of Expansion or Contraction takes place just below the melting point in Cast iron on account of Contraction near MP is necessary make moulds for castings proportionately larger than Castings are required to be
Contraction Grey C Fe 1 pct.
which from 2 to 2.5 of linear dimension
Cast Fe undergoes permanent increase bulk under long continued heat

grey Cast Fe
at elevated temp^a oxidizes sooner
than malleable Fe.

Conc
White Cast Iron Cooled in HCl hot
Entirely dissolved – grey C Fe
leaves residue of graphite
in both cases Combined C Enters into
Combination with the Nascent Hydrogen
forming Volatile Hydrides.

acha. [illegible] HCl –
White C – Bulky, dark Brown residue
sol in KO, readily Combustible C, leaves
black residue Containing Silica.
grey C – Residue part graphite.
partly of Carbonaceous sub as White C
+ some black Carbonaceous stuff which
is magnetic takes fire in air + leaves
Ferric oxide –

grey Fe 2.@ 4.65 C
white 3.5 @ 5.75 Carb

Magnetic pyrites.
slightly magnetic – sp gravity 4.15 @ 4.7
occurs Crystalline Compact or granular
60.49 – Iron – 39.51 Sulphur
Arsenical pyrites – Cobalt pyrites
other than Ni Co pyrites get formula.

Alloys

3 pts Bismuth 1 Fe steel magnetic
Lead – 96.7 Fe 3.24 Pb – magnetic

Manganese 22% off it remains Fe
non magnetic

Molybdenum Equal parts; magnetic
Bluish gray brittle, fine grained –

$FeBr_2$ $Fe_2Br_6$ –

$FeCl_2$ $Fe_2Cl_6$ –

$FeI_2$ $Fe_2I_6$

Fixed alkali precip. iron from solution with White Hydrate.

Fe forms 2 oxides

Proto FeO + sesquioxide $Fe_2O_3$

Varying amounts of the latter which may be regarded as compounds

The intermediate Sulphide

Protosulphide + sesquio is magnetic

first no iron ore –

Octoferrous Sulphide $Fe_8S_9$ magnetic

Hemisulphide $Fe_2S$ "

proto, FeS non mag

Sesquisulph $Fe_2S_3$ non mag

Ferroso-ferric Sulphide – magnetic pyrites

Disulphide Fe $FeS_2$ non magnetic

action cold air non

Cold bars appear crystalline on fracture

Warm bars " " " fibrous

all this has been denied – but proof given by RR reasons –

See Barrat: Phil Mag (4) XVII 51.

also (4) XVI 478 –

Hankel Ann phy chem 2 i 285 –

Rowland phil Mag (4) XVI 10

XVIII 321.

A L Holz – Pogendf – CPi 69 –

CPi 67

Ann phy – Ergänzbd – VIII 353.

Journal f Chem 1877 171 –

300 — 40 — 120 — 168

180

132 — 20 — 69

63 — 12 — 34

29 — 5 — 16 — 70 3 270

13 — 3 — 7

6

3

2

1

400 — 408

429

429

2 231 5 50 — 12 — 13 — 50 — 544 — 86 — 50 — 688

132 — 64 — 63

132 50 — 6600 — 20 — 86 — 300 — 168 — 132 — 9 — 7

13 — 63

86 — 68 — 18

210 — 168 — 42

29 50 — 145 50 — 1 — 13 — 50 — 1566 50 — 50 — 9000

29 — 16 — 13

130 3 390

120 — 90 — 21 50 — 168,000

L Kalp - pog Anal. 320 CLV

Trève & Duranvar Compt R. LXXX 799

LXXXI 1123 - 1246 -

gamin ibid LXXXI 1126.

Beelz pog Anal CLII 484

Gangain - Compt Rend LXXXII 149

& LXXX 297 — LXXXII 685 - 1422

gamin Compt R LXXVII 89 -

Favé - " " LXXXII 276

Daubrée " " LXXXII 279

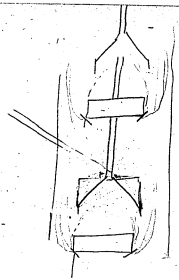
& LXXX 5-26.

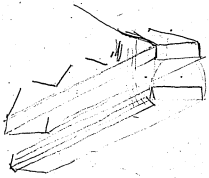
gangain Compt R LXXXIII 661 896

LXXXV 219

Tournaist — C Rendu LXXX 1007.

Maumé " same — p. 1138





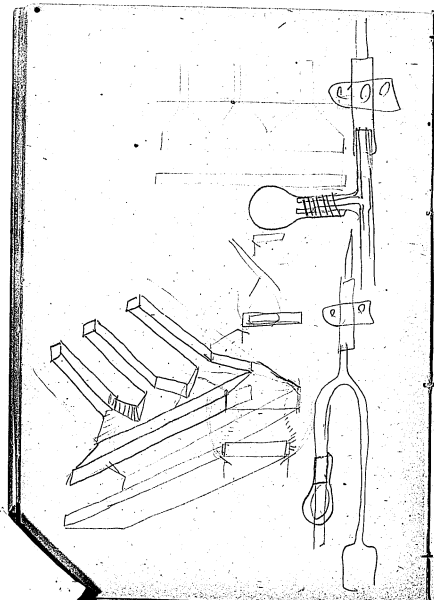
Burton T - Proc Roy Soc XXIII 445 473

G Wiedemann Pogg Ann
CXXVI 1 CXXXV 177
(2) IX 145 - Phil Mag
(4) XXX 366 XXXVII 314 -
(5) IV 161 276 —

T L Phipson Bull Soc Chim (2) VII 322
Chem News XXXII 162

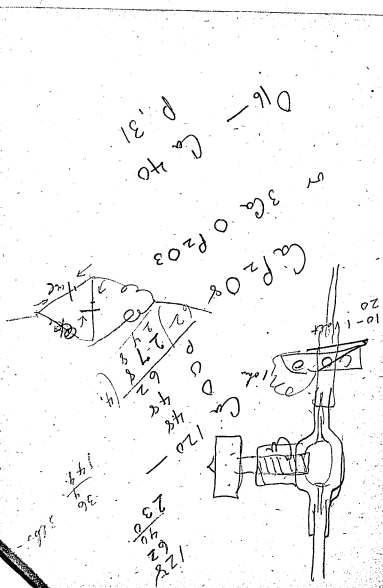
Maxwells Theory

Magnetic Electric phenomenon due to substance matter under certain conditions of motion or of pressure in every part of the magnetic field - the substance producing these effects may be a certain part of ordinary matter or it may be any other associated with matter



2 = Condition of any part of the field through which lines of magnetic force pass is one of unequal pressure in different directions, pressure being least along lines of force so that they may be considered lines of tension —

3 This unequality of pressure is due to Vortices coaxial with the lines of force — The density of revolving matter is proportional to the magnetic permeability of the medium. The direction of rotation is related to the direction of the line of force & the velocity of the circumference of the vortex is proportional to the resultant magnetic force —



4th The Vortices are separated from each other by a single layer of round particles so that a system of cells is formed. The partitions being layers of these particles & the substance of each cell being capable of rotating as a vortex –

5th particles forming the layer are in rolling contact with both the Vortices which they separate but do not rub against each other. They are perfectly free to roll between the Vortices & so to change their place – provided they keep within one complete molecule of the substance but in passing from one molecule to the other they sometimes generate irregular molecules & generate irregular molecules which constitute heat.

8000 – 1 deg C.

1 gm C heat 8000 gms of $H_2O$ 1 C
sp ht 2.05 – .15
1 gm C heat 48000 gms Iron or 1
1 gm C heat. 48 – gms Iron or 1000 C.
2
6

15 | 100 (6 – 90
90

1 | 48000
1 ton 48000 – 27000 deg
20

6 | 4 – 50
3
7 | 0.4. 50
50
2

200) 48000 (240
400
800
48,000

200

1000
32
9 | 9 6 8
5
9 | 1 4 4 0
9 | 1 4 4 0
9 | 0 0 5 5 6
3
9

These particles of the part of Electricity. Their motion of translation constitute an Electric Current, Their rotation serves to transmit the motion of the Vortice from one part of the fluid to the other. The Longitudinal pressure thus set up by any Constitute Emf & the Electric [illegible] of the Conjugating particles Constitute Electric drop Commutant.

5000
32
9 | 4 9 6 8
4
5 5 2.
2 2 h
2 1 2 | 4
1

212
32
180
9000

1000
9
5 | 1 8 2 7 8
3 6 5 4

9.
11

1000
9
5 | 9 0 8 2
0 1 2

9000
212
32
1 0 8 8
3 2
1 0 2 8

(Theory 2 - Edison)

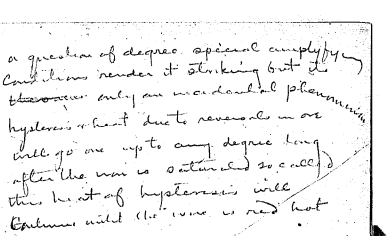
production of E is a molecular disturbance - a forced disturbance of molecular architecture, It is never a continuous disturbance but momentarily, although disturbances produce waves in the Ether of frequency comparable to light vibration - Sound Vibrations are Emanations, not molecular -

If molecular disturbances are made near a conductor, the only reason that the wave passes along a Conductor is due to the molecular hysteresis of such conductor producing a Lag between the Ether in the "Mallet" & the Ether of the boundary.

Were there no lag telegraphy would be impossible - this hysteresis produces heat - Each wave produces a movement of the Molecules + a return + released friction gives the heat.

The same holds good for wave

The phenomena of Magnetism is only a question of degree, special complying Conditions render it striking but the ~~theory~~ only are molecular phenomena hysteresis + heat due to reversals in one will go on up to any degree long after the wave is extinguished so called, this heat of hysteresis will continue until the wave is real hot + above




There are no wheels of the Ether around a Copper wire -

The wave is like a wire put in the Center of a phone funnel. it goes forward along the wire & not into space as with sound by reason of the Lag in the Ether in the wire

due to necessity of work being done in disturbing the molecular equilibrium.

Copper molecules return to zero at each wave while iron does not owing to the molecules being work the molecular structure more & more till a stationary condition until a quiescent state is reached depending on the manner when no further deformation of the structure takes place – when this condition is reached in hard steel, it is the permanent condition of the normal condition of matter in connection with the Ether. The 2 form a fixed state system in which nothing moves – The passage of a wave through this fixed system in air simply serves to disturb the molecular condition of the wire & produce waves

which pass over the wire by the disturbing due to hydrogen work in the wire.

were the internal molecular friction in copper as great as in iron should have magnetism

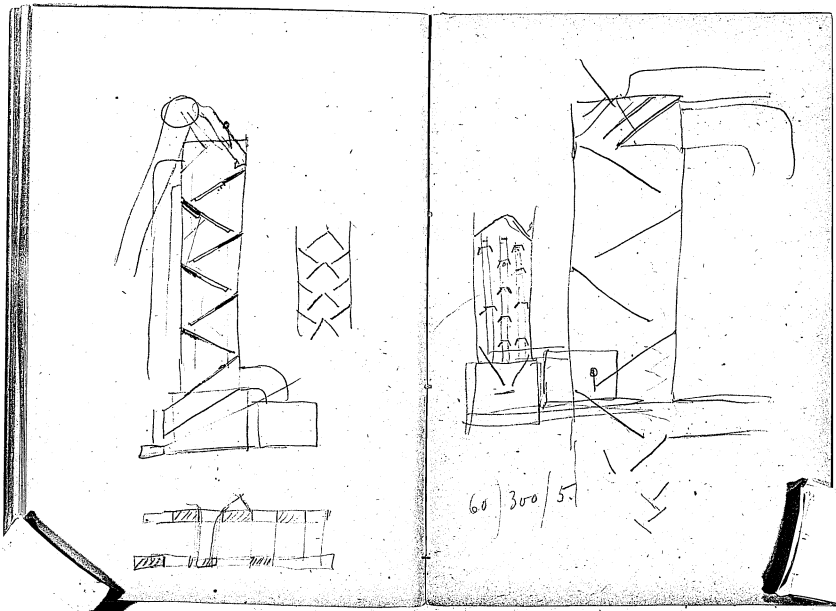
The resistance of Copper and Zinc is the same, but the work done in the Zinc by hydrogen is greater, there is a greater amount of Energy however say it has more resistance. The difference in the function is measured by keeping Zinc at 30 & raising the temp of Cu until both have the same apparent R then the heat added to Cu represents the internal friction of the Zinc –

373.5
865.
3735
5595
24

.12
45
60
48.0
54

100/5.4 m amp

2/1000 ohms


60 | 300 | 5

400) 3200 (

32) 4000 (15
32
80
48

25

15 at 200 -
9.75 - at 5.00 -
3.75 - 1000 -

4

13 - 5.00
6½ 20.00

6

27
13 5 -
48
14

3) 270
90
360

2240
270
1970 (5½
1870
100

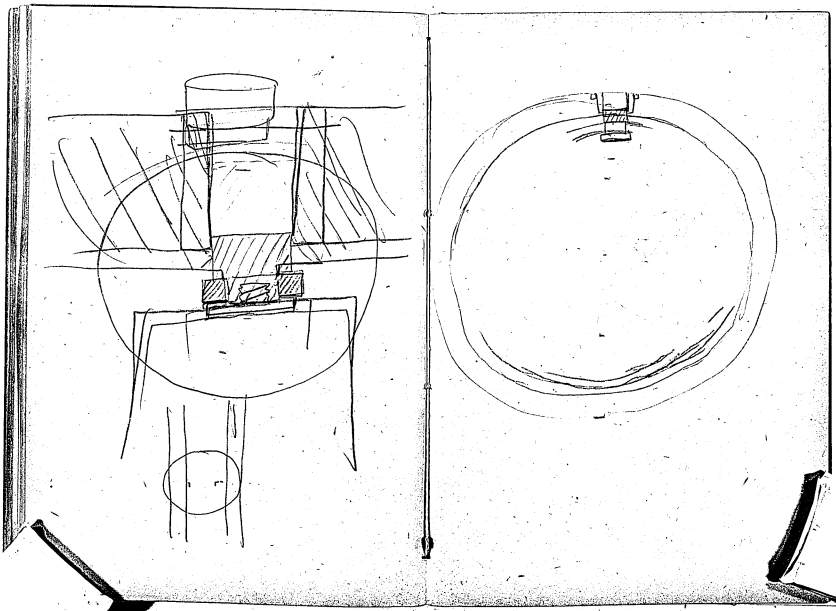
Theoretically 1 ton pure coal will reduce 80 tons of iron ore to 1000 deg fahr.

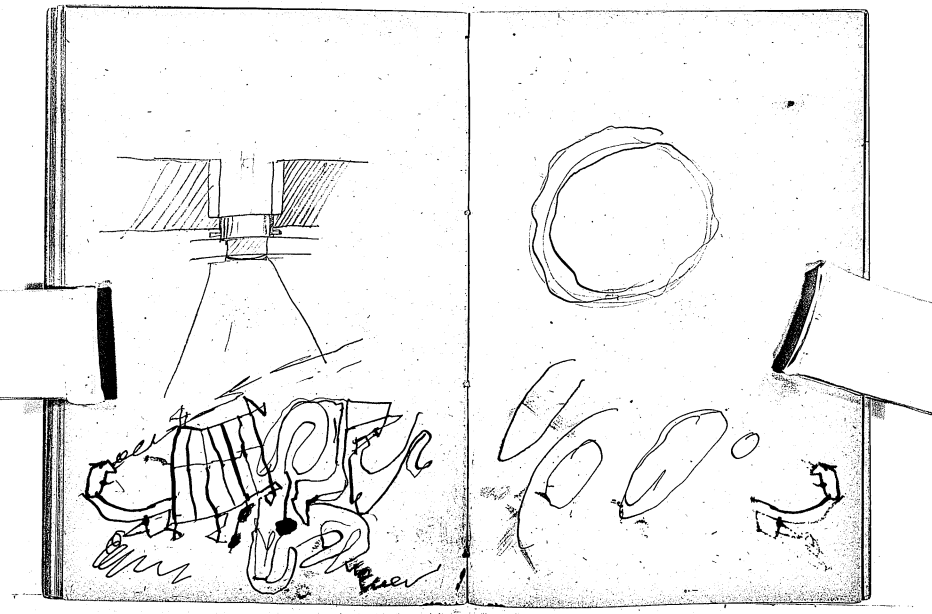
If all heat regenerated - & ejected at 200 fahr finally ~~assuming~~ 27 lbs air per ton Coal burned & specific of air .16 then.

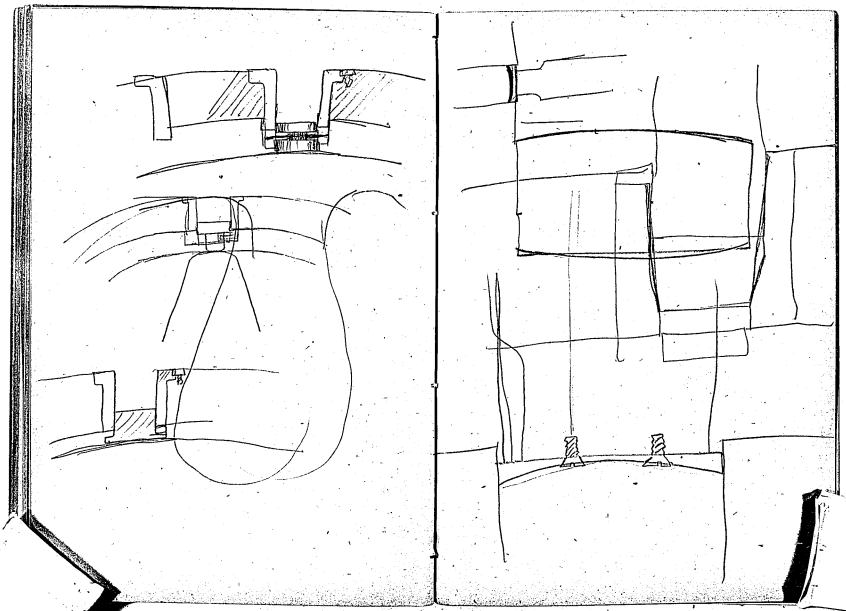
~~27 tons of air~~ then the 27 tons air at 200 is equivalent to equivalent to 6½ tons ore -

Reducing it from 80 tons to 73½ =

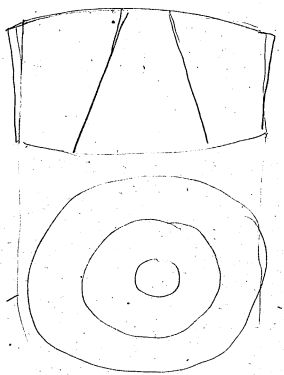
If ton coal per hour is used then 27 tons of air ejected at 200 requires 10 lbs per ton or 270 lbs. for the air ejected for ejection at 300 - we can have 148 tons -



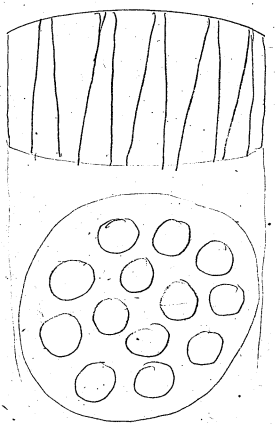


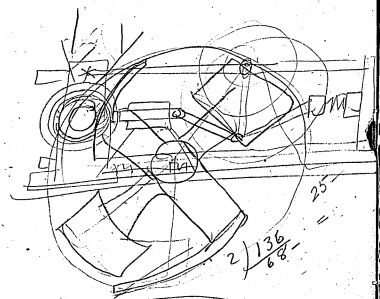


$$2\overline{)3.3}\quad 1.6$$



$$\begin{array}{r} 65 \\ 10 \\ 13 \\ 16 \\ \hline 94 \end{array}$$





25

2/136
68

2/368
184 198

4/61
15
80
120
30
80
24.0

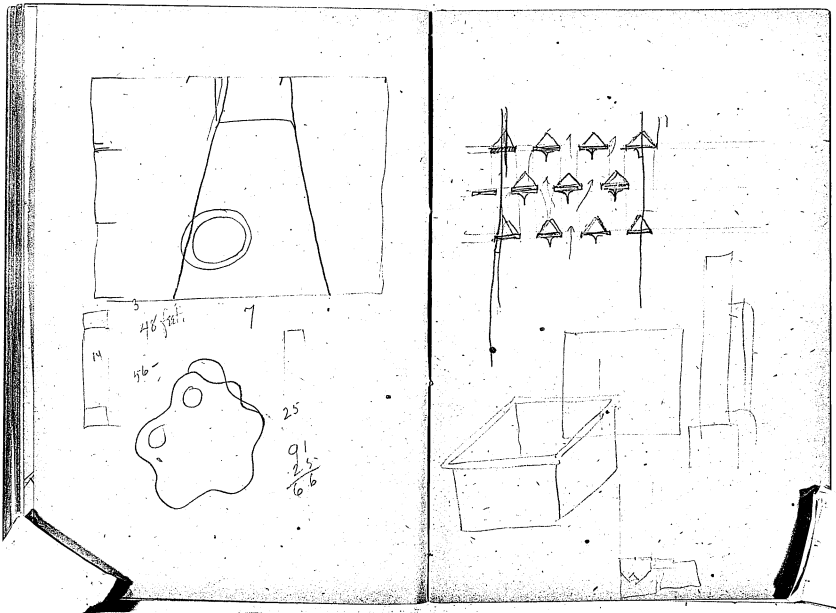
4/76
19
80
152
4/31
8

4/49
12
80
96

4/39
10
80
80.0

100 — 24
76 — 15
61 — 12
49 — 10
39 — 8
31 — 6.5
25 — 5
20 — 4
16 — 3.2
12.8 — 2.5
10 — 2
8 — 1.6
6.4 — 1
5
4
3
2
1

25
8


3
48 feet
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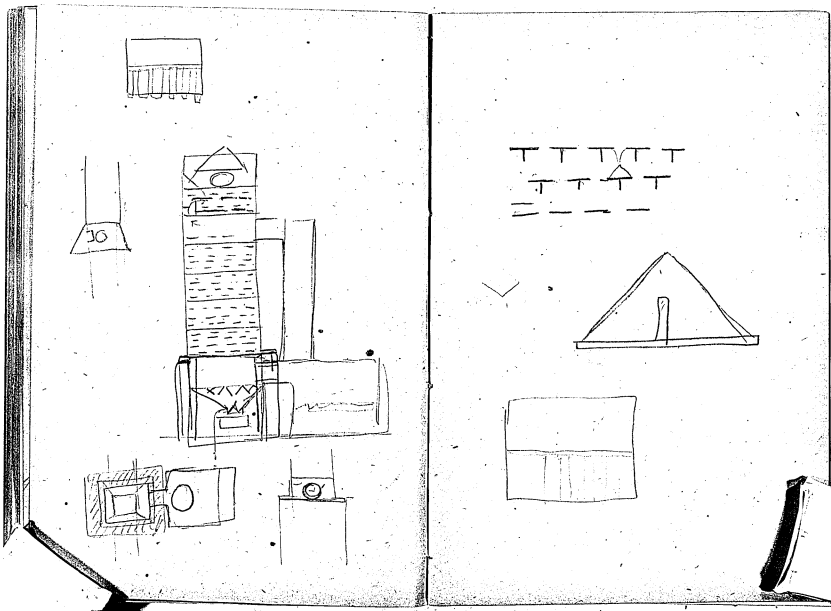
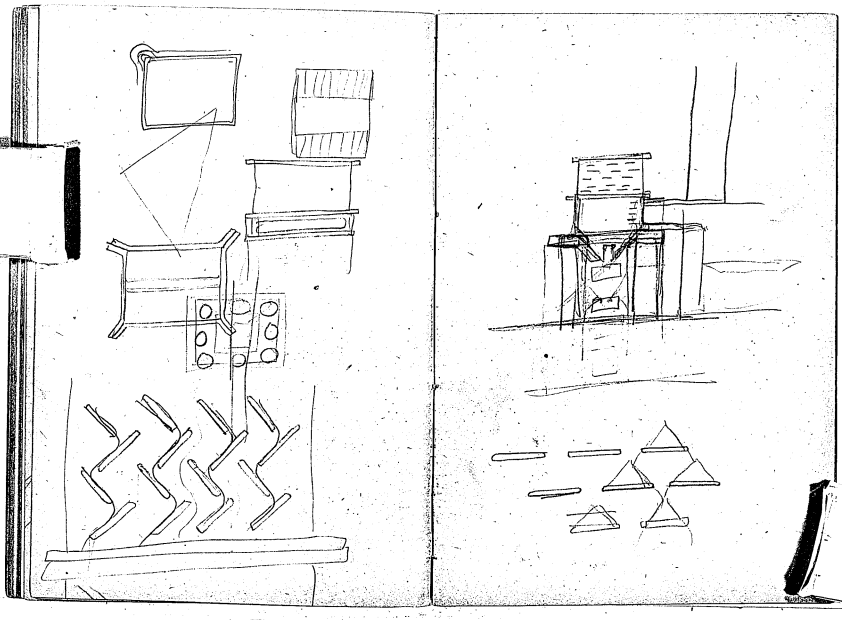
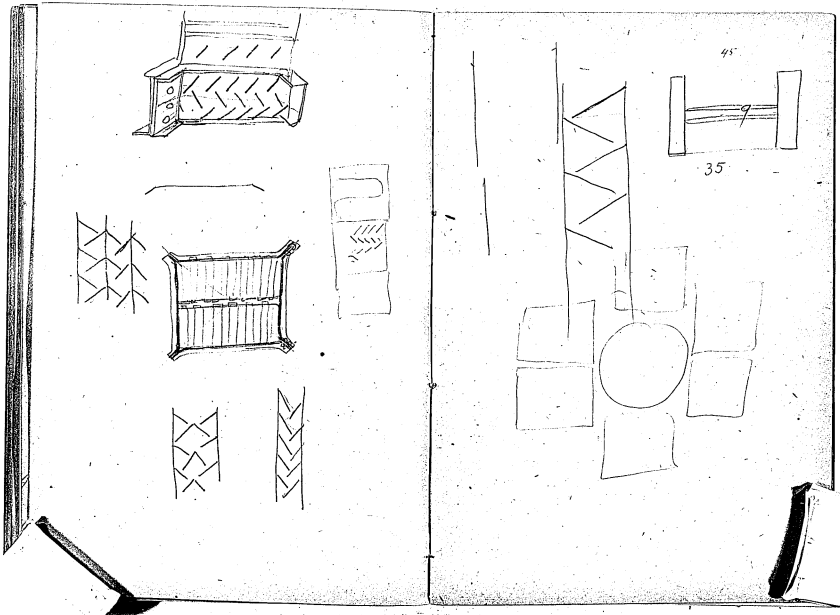
56
25
91
25
66



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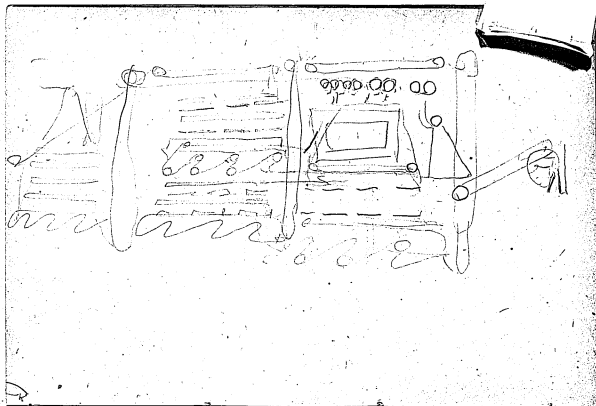
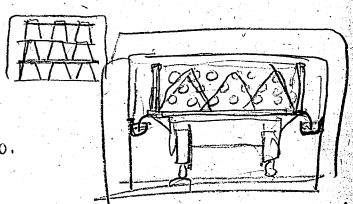
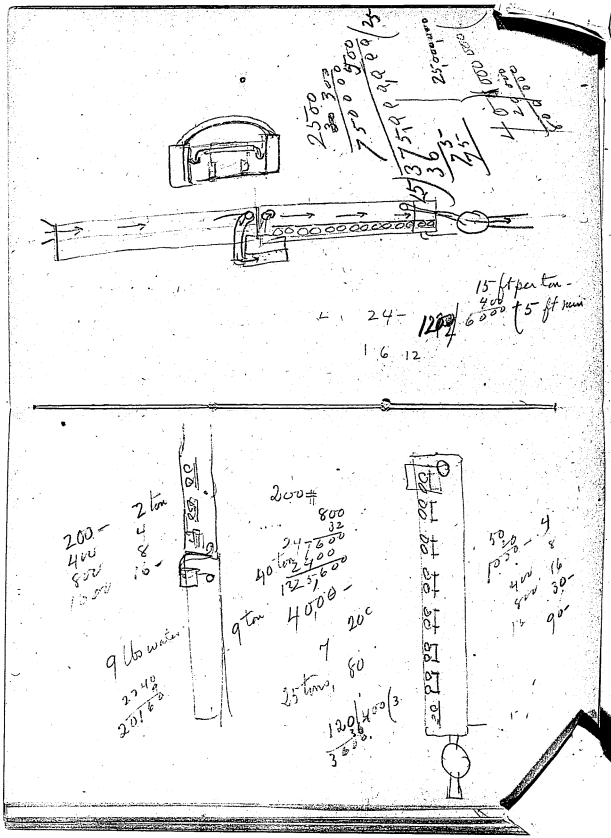
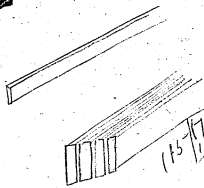
35





60) 1200 (20.


15 ft per ton
5 ft min
24
1 6 12
200#
800
40 tons
9 tons
4000
20c
80
25 tons
9 lbs water
2 tons
200
400
800
1600
8
16
50
4
400
16
800
30
1600
90

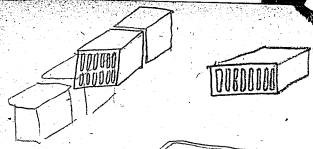


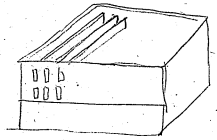
115 | 1720 (15.
115
570
570
570

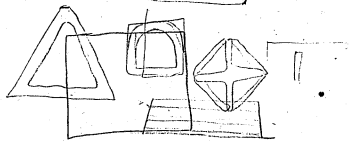
8000 sh. - 144
80
1520
1440
2
24
24
28
8000
6000
40 ton.

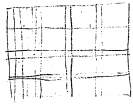
8000
4000
24
1600
48
1600
1600
7000
40
Redhorse

24 - 135



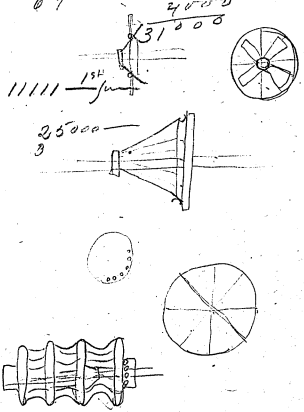


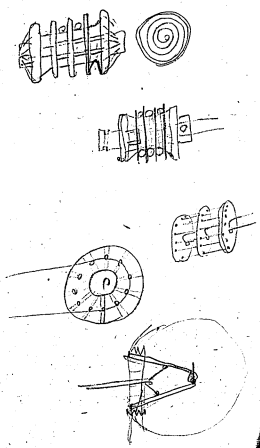


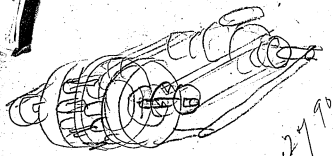


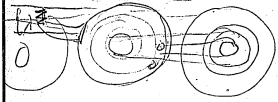
16
4
64

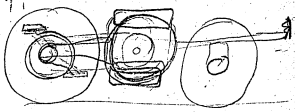
22000
3000
2000
4000
31000

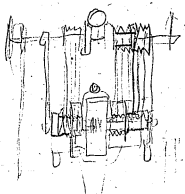


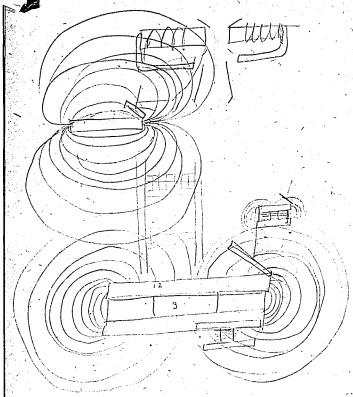





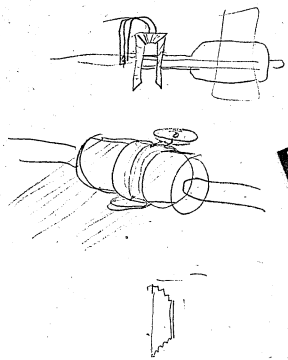









May 28 90 9a E ERB



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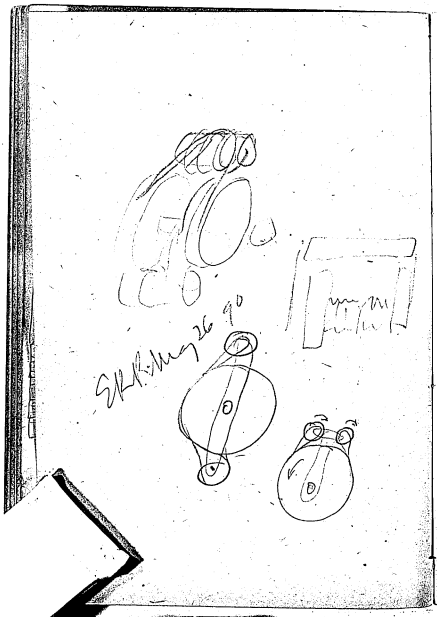
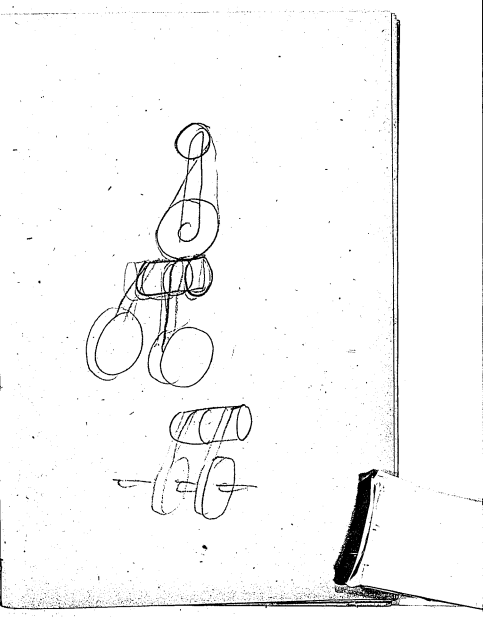
TM


SKRiMy 26 9°



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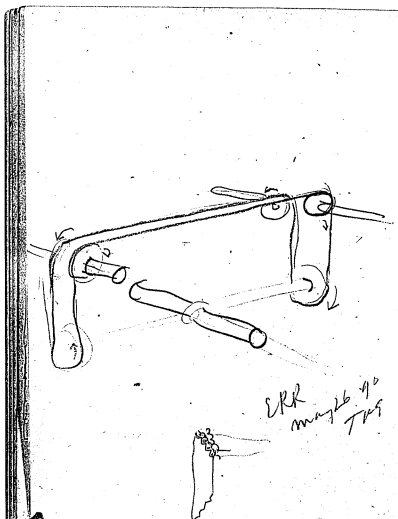
Fans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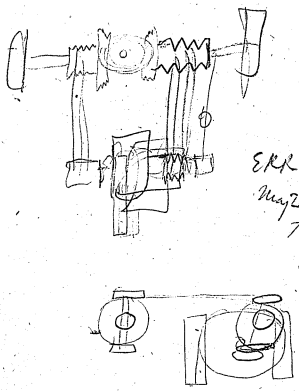
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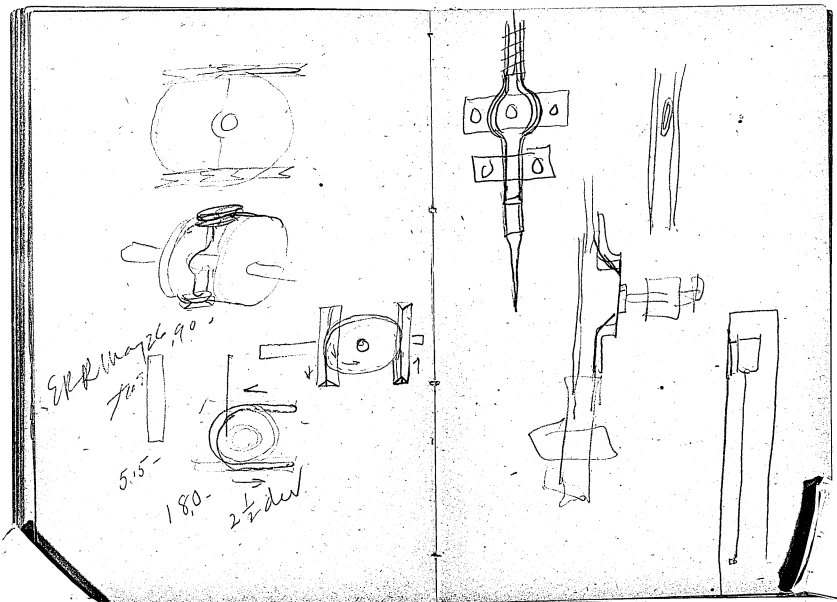
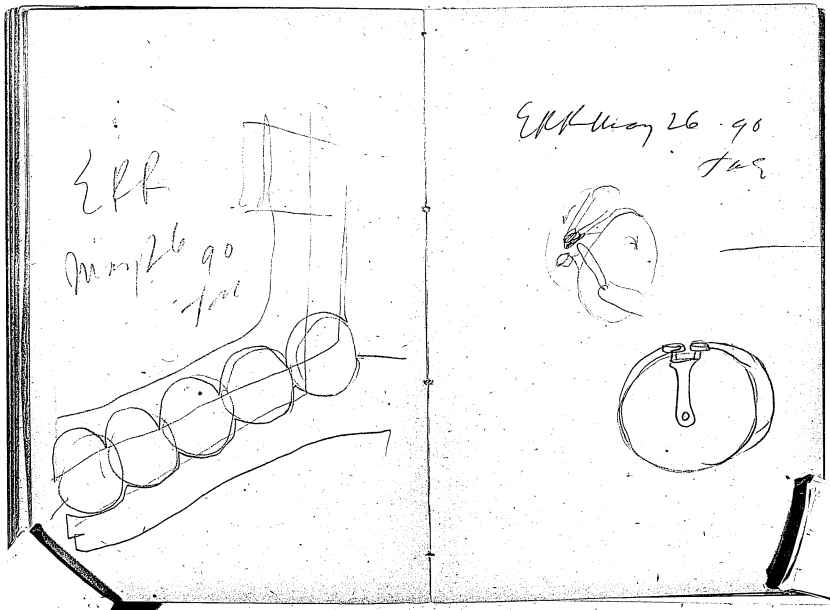
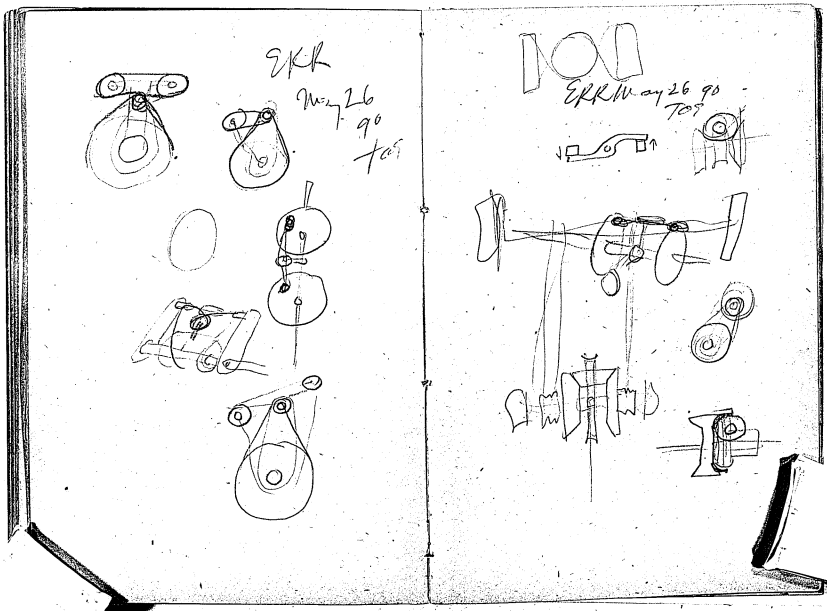

5.5
180
2½ dia


EPH
Memphis 90
EPH May 26 90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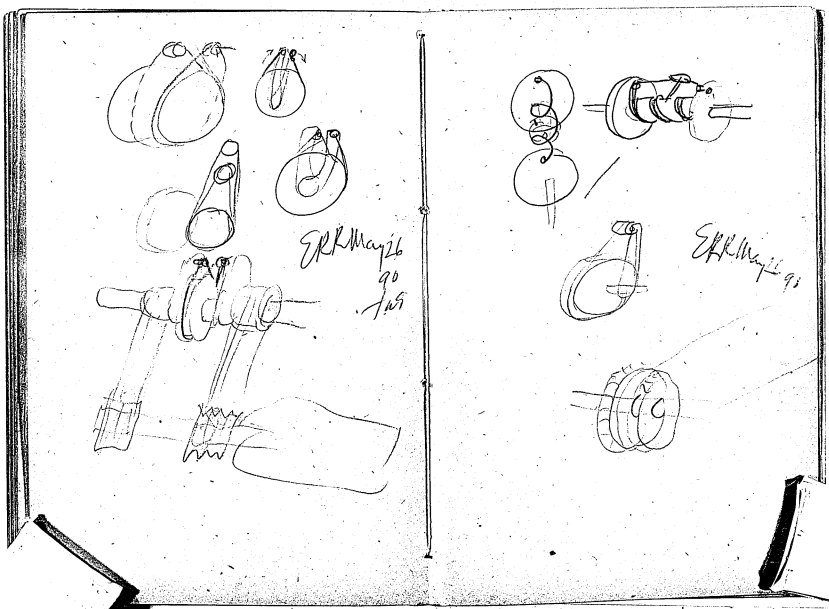
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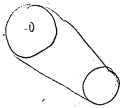

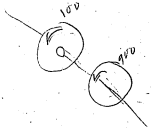

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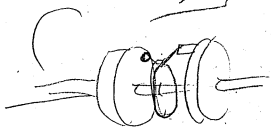

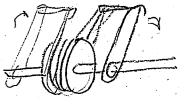

EKK May 26/90

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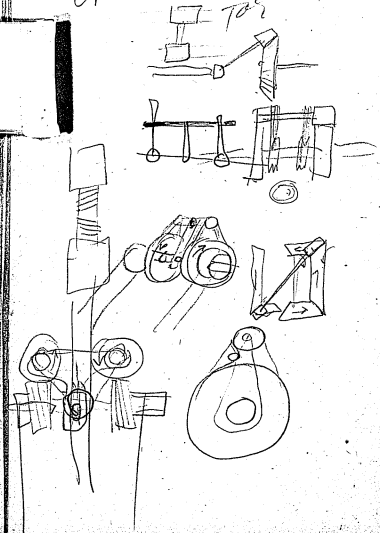

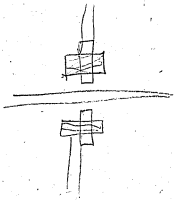

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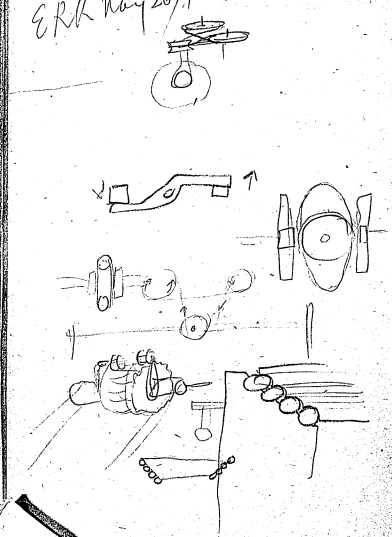

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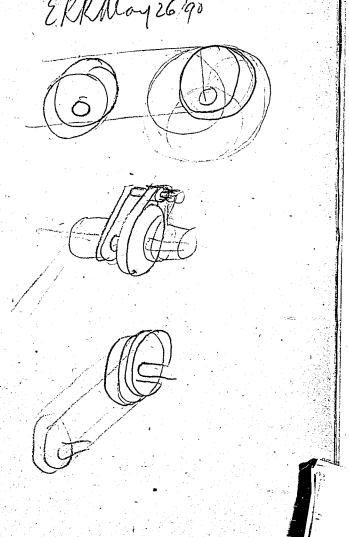

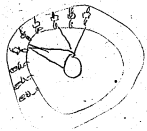

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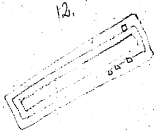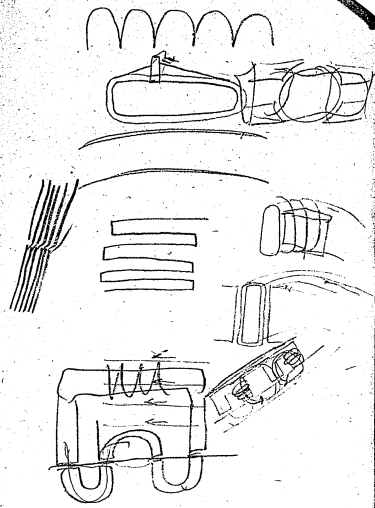
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